Space Weather Forecast

Issued on Sunday 27 October 2024 at 01:34 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Ongoing S1/Minor Solar Radiation Storm. Moderate flares expected, chance of further Strong flares. Chance of G1-G2/Minor-Moderate geomagnetic storm intervals Days 1-2 (27-28 Oct).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity became High following a Strong flare that originated from sunspot regions on the southeast of the disk. This flare began shortly before 26/0600 UTC and peaked at 26/0719 UTC.

There are currently twelve sunspot regions on the disc. The main focus is a cluster in the southeast of the disc, with three significant regions located here. They all maintain fairly complex appearances and magnetic configurations. A further sunspot region in the northeast of the disc has developed some magnetic complexity over the past 24 hours. Most other regions on the disc are smaller but multiple regions showing gradual development and a general increase in sunspot activity.

The large CME (Coronal Mass Ejection) associated with the long duration Strong flare on 26 Oct has been modelled by Enlil to have an Earth-directed component.

Solar Wind / Geomagnetic Activity: Solar winds were initially around Slow-ambient speeds, generally varying between 310-340km/s, gradually rising around 1300 UTC before sharply rising around 26/1535 UTC to peak at 500-510km/s. Speeds have since declined to 450km/s but remain at Slightly Elevated levels. The Interplanetary Magnetic Field (IMF), Bt, was initially Weak, increasing to Moderate from 26/1134 UTC before sharply rising to Strong around 26/1535 UTC where it has since remained. The important north-south component, Bz, was initially Weak, though became Moderately positive around 26/1300 UTC before fluctuating Strongly between positive and negative following the peak in Bt. Geomagnetic activity was Quiet (Kp 0-2), increasing Unsettled to Active (Kp 3-4) upon arrival of one or more glancing blows from CMEs, and potentially connection to a stream of coronal hole fast winds.

Energetic Particles / Solar Radiation: The count rate of energetic particles (High energy protons) was below alert levels for much of the period but displayed a gradual rising trend. A Minor Solar Radiation Storms has been ongoing since 26/1805 UTC.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

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Four-Day Space Weather Forecast Summary

Solar Activity: Generally Moderate activity is expected, with occasional Moderate-class flares considered likely and a chance of Strong-class flares, most probable from the numerous active regions in the southeast disc.

Solar Wind / Geomagnetic Activity:

Ongoing Coronal Mass Ejection (CME) enhancement is forecast to wane through 27 Oct. A further CME arrival associated with the Strong flare on 26 Oct is projected to arrive later Day 1, but more probably on Day 2 (28 Oct).

Solar winds are currently at Slightly Elevated levels but may peak at Elevated to Strong levels following subsequent CME influence 28 Oct. A return to mainly Background winds is currently expected by Day 4 (30 Oct).

Activity is expected to be Quiet to Active (Kp 2-4) during Days 1-2 (27-28 Oct) with a chance of peak G1/Minor to G2/Moderate Storm (Kp 5-6) conditions during Days 1 and 2 (27-28 Oct) as a result of combined coronal hole fast wind and ongoing and forecast CME influence. Activity is expected to return to Quiet to Unsettled levels by Day 3 (29 Oct), although further flare and CME activity from the numerous active regions in the southeast disc could change this.

Energetic Particles / Solar Radiation: The count rate of energetic particles (High energy protons) is currently at S1/Minor Radiation Storm levels, but is forecast to decline towards Moderate levels through Day 1 (27 Oct). Ongoing Chance of further S1-S2/Minor to Moderate Radiation storms, mainly Days 1-2 (27-28 Oct) associated with Strong flare on 26 Oct.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	**G1 to G2**	No	30	30	5	5
Strong	**G3**	No	1	5	1	1
Severe	**G4**	No	1	1	1	1
Extreme	**G5**	No	1	1	1	1

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Radio Blackouts - X-Ray Flares

X-Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 (M Class)	Yes	80	80	70	70
Very Active	R3-R5 (X Class)	Yes	20	20	20	20

Solar Radiation Storms (High Energy Protons)

Radiation Storms	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	Yes	99	20	20	20
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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